
FRBSF WEEKLY LETTER

January 11, 1991

Tapping the SPR

In 1977, the federal government began purchasing crude oil and pumping it into salt domes in Texas and Louisiana. Since that time, 590 million barrels of oil have been pumped into this "Strategic Petroleum Reserve (SPR).

The over-riding objective of the reserve was to provide a supplemental inventory of crude oil for those times when disruptions to the oil supply threatened. Reserve facilities have the capability to deliver as many as 3.5 million barrels of oil per day to domestic refineries. Over the years, the SPR has served several other governmental objectives, as well. For example, purchases of additional volumes of Mexican crude oil aided Mexico during its fiscal crisis in 1982.

The current crisis in Kuwait has raised the issue of the proper use of the SPR. Changes in the structure of the oil market, especially the lifting of oil price controls, have altered the apparent purpose of the SPR. This change in purpose, and its implications, form the focus of this *Letter*.

Changing role

The SPR was created in the wake of the 1973–74 Arab oil embargo. Gas lines and spot shortages convinced policymakers that the United States needed an additional inventory of oil to tap in the event of future disruptions. At the time the policy was established, oil prices were regulated. Although the government had removed wage and price controls from most commodities by 1975, nonmarket forces continued to set the price of oil. Those price controls exacerbated the supply disruption in 1973–74 (and to some extent in 1979–80) by preventing prices from rising to balance supply and demand.

With the elimination of price controls on oil in 1981, the SPR lost some of its original purpose. Since prices could rise to reduce demand when demand exceeded supply, shortages were less likely to emerge in reaction to negative supply shocks. Now that prices provide a decentralized, efficient mechanism to allocate available supplies, the SPR as originally intended is no longer essential.

In the current crisis, there is renewed debate over the central purpose of the SPR. Most frequently, the debate centers around whether government should tap the SPR to augment world supplies and thereby reduce oil prices. This new role acknowledges that market forces should act as the primary mechanism for allocating oil during "normal" times. However, it implicitly suggests that government has a role in stabilizing prices during "unusual" events, particularly in keeping prices from rising too much.

The role of expectations

Current oil prices reflect the market value of the oil today as well as traders' expectations about the future value of that oil. If some event, such as OPEC production cutbacks, accidents, or demand increases, were to raise expectations about the future price of oil, the expected future price of oil would exceed the current price. The difference would cause traders to withdraw oil from current consumption and to increase inventories for later sale. The inventory adjustment would raise current prices and reduce upward pressure on future prices. Prices would stabilize when the value of current use equaled the expected value of storing the oil and selling it in the future.

When uncertainty about the future is relatively "normal," changes in expectations due to some current event result in a relatively predictable change in supply or demand in the future. In such cases, market inventories work to smooth supplies over time.

In a period of crisis, however, prices may rise because of heightened uncertainty. Traders' expectations about future prices rise as traders incorporate the possibility of large future disruptions into their assessments. Brokers hedge against this possibility by holding larger inventories. Large enough additions to inventories would cause big and rapid increases in current prices.

Oil prices, therefore, reflect the market's assessment of the expected future value of oil. Both

FRBSF

the probability of a disruption and the effect of a disruption on prices if the disruption were to take place affect the market's evaluation. Should either factor increase, brokers would increase inventories, and thereby raise current prices, even if supply has not physically changed.

When Iraq invaded Kuwait, prices rose because the probability of a disruption to supplies rose sharply. Prices have risen because of *potential* future disruptions, not actual shortages. Increased production by other OPEC countries has now offset all of the shortfall from Iraq and Kuwait. Moreover, inventories at the start of the disruption were unusually high, and, in the U.S., remain above last year's level.

This situation creates an opportunity for using the SPR to moderate oil prices in two ways. Most obviously, SPR oil can augment supplies to drive down prices. Just as importantly, *a clear statement of when events would trigger use of the SPR would reduce prices even if we were never to draw oil out of the SPR.*

An insurance role for the SPR?

Government inventories, both in the U.S. and abroad, can act as insurance to oil companies against potential disruptions. A clear understanding by the market of when and how authorities would release SPR oil would allow traders to factor that increased supply into their expectations. In this way, the availability of the SPR could limit traders' assessment of the upside risk of future price increases. Firms may find it less important for them to hold oil as a hedge against that possible increase.

The market could even institutionalize this insurance in the form of options for sale. Traders could hedge against potential disruptions by buying options to take SPR oil when prices rise above the government's price.

For example, the government could offer to sell an option to buy 1,000 barrels of oil in January at \$50 per barrel. The price that traders would pay for the option would depend on their assessment of the likelihood that the market price would exceed the "strike price" in January. If a disruption were to occur, and prices rose above \$50 per barrel, the owner of the option would exercise

the option and buy the oil at the \$50 price. If the disruption were not to occur, the trader would let the option expire unexercised.

Selling options on SPR oil tells the market that the SPR will augment world supplies by a predetermined amount in the event of a disruption. The increased supply, in turn, will put downward pressure on larger price moves. Knowledge that such action is forthcoming will reduce uncertainty and cause traders to lower their expectations about how high oil prices could go.

Whether or not options come about, the insurance role of the SPR depends on a clear understanding by the market of when authorities will sell the oil and at what price. Unless the market can confidently predict how the SPR will augment supplies, the SPR will have little effect on current prices and inventory behavior.

Catastrophic insurance by government?

In most cases, the private market can manage the insurance function described. Traders can hedge against changes in OPEC policy before OPEC meetings, and they can hedge against possible disruptions from fires or oil spills. However, private inventories are not large enough to offset potential disruptions that are unusually large and unforeseeable, such as the current crisis. In those cases, government may have a role in maintaining an inventory to augment world supplies.

Under what conditions should the government intervene? Although the current crisis seems like an obvious candidate for using the SPR, some have argued for using the reserve to stabilize prices in more normal circumstances. In this debate, we need to separate two issues: government's role as a supplier of catastrophic insurance, and its role as a price stabilizer. We can reasonably argue for creating catastrophic insurance, but price stabilization by government is more problematic.

In catastrophic circumstances, assuming that the social benefit of the added security is sufficiently high, it may be in the public's interest for government to maintain large oil stocks. The cost of maintaining stocks large enough to provide insurance against major but temporary supply shocks may be too high for private agents, given the low

probability of catastrophic events and the high cost of storage. Through its ability to tax individuals, the government can pay the cost of maintaining reserves, whereas a private agent does not receive compensation for holding stocks unless those reserves are actually used.

In addition, private insurance markets can allow individuals to write contracts offsetting economic harm only by taking money from people unaffected by a negative event to compensate those that were affected. In the case of a major disruption to economic activity, where the costs are extremely high and spread over most of the population, a private insurer is unlikely to have the resources to pay the total cost. Furthermore, the rates necessary to compensate for the potential loss probably would be too high to attract customers. The use of government oil, in contrast, not only represents compensation from a pool of revenue but a possible source of economic growth. Because oil is a factor of production, increased sales of government oil would boost GNP, and partially offset the negative effect on output caused by the disruption.

Caution with price stabilization

This insurance role for the government only applies to catastrophic events. Providing insurance to stabilize prices in more normal times is probably best left to private markets. Two examples demonstrate the problems facing more active government stabilization policies.

Throughout most of the post-war period, until 1972, a public agency effectively set oil prices in the U.S. The Texas Railroad Commission (TRC) maintained higher-than-market prices for oil by rationing production in Texas. Refiners told the TRC how much oil they wanted at the going price (which remained almost constant). The TRC calculated the demand for Texas oil after accounting for imports and non-Texas production. Then it told Texas producers the percentage of their potential production they could produce to fill the remaining quantity demanded.

The TRC's power to control prices depended on its ability to maintain an above-market price and excess capacity in Texas. By 1973, rising consumption had pushed the market price above the controlled price, and the TRC could no longer restrict Texas production. With the loss

of excess capacity, it was no longer able to regulate the market.

Foreign exchange operations provide another example of mixed results. When the dollar is falling "too much," other central banks often buy dollars to push the dollar back up. When the dollar is rising "too much," the U.S. sells dollars and buys foreign currency to try to drive the dollar down. Central banks may be able to "defend" a currency for short periods of time, but they cannot maintain a level different from that of the market for very long.

The lessons for the SPR from these two examples are important. First, to be effective, government must have sufficient inventories to be able to defend a nonmarket price for some time. Second, this strategy is only possible when the level defended actually balances supply and demand in the long term.

Geology imposes a final limitation on a strategy of frequent intervention. The salt domes into which we have pumped SPR oil can only be reused a few times. It is not technically feasible to pump oil into and out of the SPR on a regular basis.

Conclusions

In the current crisis, the SPR could be helpful in calming markets when used as "insurance" against significant temporary losses of OPEC production should war break out. A clear statement of the conditions for releasing SPR oil would reduce traders' assessments of the upside price risk, and probably lead to less build-up of inventories.

Over the longer term, there is some justification for the SPR to serve as insurance against supply disruptions that result from political crises. But there is little justification for government to use the SPR in a policy of regular intervention to stabilize oil prices in the market. Experience in other markets suggests that government manipulation of prices works only when the government has very large inventories and is aiming for a target price close to that which would emerge in a free market.

Ronald H. Schmidt
Senior Economist

Research Department
Federal Reserve
Bank of
San Francisco

P.O. Box 7702
San Francisco, CA 94120